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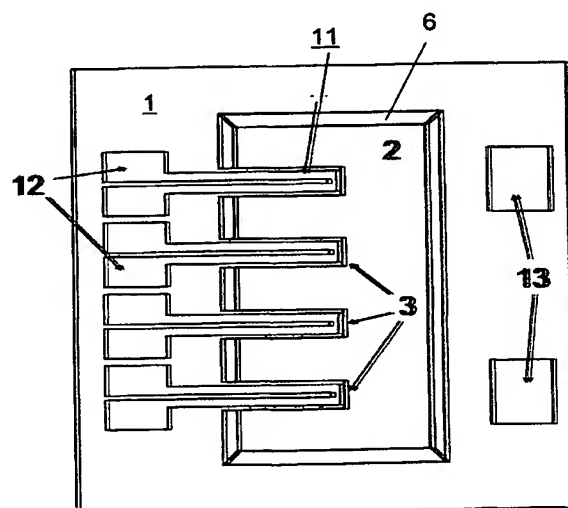
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(54) Title: A CANTILEVER ARRAY CHEMICAL SENSOR



(57) Abstract: The invention relates to a chemical sensor comprising one or more cantilever sensor units with a piezoresistive element for direct read out. The sensor comprises a primary substrate carrying the cantilevers and with a primary cavity and a primary connecting surface at least partly surrounding said cavity. The cantilevers protrude into the primary cavity. The piezoresistive elements are electrically connected to primary connecting pads on the primary connecting surface. The sensor also comprises a secondary connecting pads, corresponding to the primary connecting pads, on a secondary connecting surface corresponding to the primary connecting surface. The primary connecting surface and the secondary connection surface are mounted to each other so that said primary connecting pads and said secondary connecting pads are direct mounted to each other, preferably in a flip chip mounting.

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A. CLASSIFICATION OF SUBJECT MATTER

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G01L1/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, COMPENDEX, MEDLINE, EMBASE, BIOSIS, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 00/66266 A (BOISEN ANJA ; THAYSEN JACOB. (DK); GREY HASIN FRANCOIS DE CHARMOY (DK);) 9 November 2000 (2000-11-09) cited in the application	1-6
Y	abstract page 2, line 4 - page 3, line 13 page 4, line 7 - page 5, line 11 page 6, line 1 - page 7, line 24 page 8, lines 4-19 page 16, line 14 - page 18, line 27 figures 1,2,7-9,11-13 ----- -/--	7-26

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01/33226 A (BALLER MARKO K ; GIMZEWSKI JAMES (CH); LANG HANS PETER (CH); UNIV BASE) 10 May 2001 (2001-05-10)	1-6
Y	pages 3-4 page 7, lines 12-22 page 8, lines 12,13 page 8, line 24 - page 9, line 6 page 11, line 27 - page 13, line 8 page 14, line 23 - page 15, line 3 figure 6	7-26
Y	----- THAYSEN J ET AL: "Cantilever-based bio-chemical sensor integrated in a microliquid handling system" PROCEEDINGS OF THE IEEE 14TH. ANNUAL INTERNATIONAL CONFERENCE ON MICROELECTRO MECHANICAL SYSTEMS. MEMS 2001. INTERLAKEN, SWITZERLAND, JAN. 21 - 25, 2001, IEEE INTERNATIONAL MICRO ELECTRO MECHANICAL SYSTEMS CONFERENCE, NEW YORK, NY : IEEE, US, vol. CONF. 14, 21 January 2001 (2001-01-21), pages 401-404, XP010534633 ISBN: 0-7803-5998-4 page 401, left-hand column page 403, left-hand column figures 1,4,5	1-26
Y	----- J THAYSEN, A D YAL CINKAYA, P VETTIGER, A MENON: "Polymer-based stress sensor with integrated readout" JOURNAL OF PHYSICS D, APPLIED PHYSICS, vol. 35, 22 October 2002 (2002-10-22), pages 2698-2703, XP002299515 UNITED KINGDOM page 2700 - page 2701	1-26
A	----- FRITZ J; BALLER M K; LANG H P; ROTHUIZEN H; VETTIGER P; MEYER E; GÜNTHERODT H; GERBER C; GIMZEWSKI J K: "Translating biomolecular recognition into nanomechanics." SCIENCE, vol. 288, no. 5464, 14 April 2000 (2000-04-14), pages 316-318, XP002299516 UNITED STATES the whole document	1-26
A	----- US 6 007 728 A (FOO PANG DOW ET AL) 28 December 1999 (1999-12-28) the whole document -----	1-26

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

/DK2004/000185

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0066266	A	09-11-2000	CA 2372508 A1	09-11-2000
			CN 1360521 T	24-07-2002
			WO 0066266 A1	09-11-2000
			EP 1207958 A1	29-05-2002
			JP 2002543403 T	17-12-2002
			US 2003154771 A1	21-08-2003
			US 6575020 B1	10-06-2003
			AU 4286300 A	17-11-2000
WO 0133226	A	10-05-2001	AU 7549700 A	14-05-2001
			DE 60012962 D1	16-09-2004
			EP 1226437 A1	31-07-2002
			WO 0133226 A1	10-05-2001
			JP 2004506872 T	04-03-2004
US 6007728	A	28-12-1999	SG 96541 A1	16-06-2003